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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,744	09/22/2003	Charles Edwan Sumner JR.	80040	3867

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EXAMINER

OH, TAYLOR V.

ART UNIT	PAPER NUMBER
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1625

DATE MAILED: 11/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/667,744

Applicant(s)

SUMNER ET AL.

Examiner

Taylor Victor Oh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected:
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/04 & 8/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

The Status of Claims

Claims 1-31 are pending.

Claims 1-31 have been rejected.

DETAILED ACTION

1. Claims 1-31 are under consideration in this Office Action.

Priority

2. None .

Drawings

3. The drawing filed on 9/22/03 is accepted by the Examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 14, 20 ,21 are rejected under 35 U.S.C. 112, first paragraph, because according to the specification, while being enabling for a catalyst, such as cobalt, manganese, bromine compounds, does not reasonably provide enablement for all the oxidation catalyst components in the field of chemistry.

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The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to all the catalysts unrelated to the current invention commensurate in scope with these claims.

Furthermore, the instant specification fails to provide information that would allow the skilled artisan to practice the instant invention without undue experimentation.

Attention is directed to *In re Wands*, 8 USPQ2d 1400 (CAFC 1988) at 1404 where the court set forth the eight factors to consider when assessing if a disclosure would have required undue experimentation, citing *Ex Parte Forman*, 230 USPQ 546 (BdApls 1986) at 547 the court recited eight factors:

- 1) the quantity of experimentation necessary,
- 2) the amount of direction or guidance provided,
- 3) the presence or absence of working examples,
- 4) the nature of the invention,
- 5) the state of the prior art,
- 6) the relative skill of those in the art,
- 7) the predictability of the art, and
- 8) the breadth of the claims.

In the instant case, the claim encompasses various catalysts. However, applicants' specification provide only one Co, Mn, Br catalyst system in two examples. Furthermore, the catalyst compositions represent an unpredictable aspect in the art of organic chemistry. See *Exparte Sizto*, 9 USPQ2d 2081 (Bd.

Of App. And Inter. March 1988). Thus, the specification herein have failed to provide sufficient working examples to support the use of various catalysts.

Therefore, an appropriate correction is required.

Claims 1-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1, 10, 14, 20, and 21, the phrase "impurities" is recited in the claims. The expression is vague and indefinite as this does not specifically describe what they are made up of. An appropriate correction is required.

Claim Rejections - 35 USC § 102

2113 Product-by-Process Claims

PRODUCT-BY-PROCESS CLAIMS ARE NOT LIMITED TO THE
MANIPULATION OF THE RECITED STEPS, ONLY THE STRUCTURE IMPLIED
BY THE STEPS

"Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 77 F.2d 695,698,227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted) (Claim was directed to a novolac color developer. The process of making the developer was allowed. The difference between the inventive process and the prior art was the addition of metal oxide

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and carboxylic acid as separate ingredients instead of adding the more expensive prereacted metal carboxylate. The product-by-process claim was rejected because the end product, in both the prior art and the allowed process, ends up containing metal carboxylate. The fact that the metal carboxylate is not directly added, but is instead produced in-situ does not change the end product.).

I. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4 and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated clearly by Zeitlin et al (U.S. 5,095,146).

Zeitlin et al teaches a process of obtaining terephthalic acid with impurities of 150 ppm p-toluic acid content (see col. 8, lines 5-14) by crystallization using flash evaporation of solvent in 3 to 6 stirred crystallization zones (see col. 4, lines 29-36). Furthermore, the slurry produced in each stirred zone is charged continuously to the centrifuge and in all operations, the centrifuge and the last stirred zone are at the temperature of 149⁰ C and pressure of 67 psig. (see col. 6, lines 51-59). In addition, the reference indicates that small quantities of water added to one or more crystallizers can have a significant effect on the reduction of impurities in the crude terephthalic acid (see col. 3 ,lines 36-38). This is identical with the claims.

5. Claims 29 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated clearly by Zeitlin et al (U.S. 5,095,146).

Zeitlin et al teaches a process of obtaining terephthalic acid with impurities of 150 ppm p-toluic acid content (see col. 8, lines 5-14) by crystallization using flash evaporation of solvent in 3 to 6 stirred crystallization zones (see col. 4, lines 29-36). This is identical with the claims. The claims are written as product-by-process claims.

6. Claim 30 is rejected under 35 U.S.C. 102(b) as being anticipated clearly by Scott et al (U.S. 4,158,738).

Scott et al teaches a process of producing terephthalic acid by oxidation of para xylene and its purified terephthalic acid (see col. 1, lines 8-10). This is identical with the claim. The claim is written as the product-by-process claim.

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor

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and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al (U.S. 4,158,738) in view of Zeitlin et al (U.S. 5,095,146).

Scott et al teaches a process of producing terephthalic acid by oxidation of para xylene in the following steps of :

- a. feeding a mixture of p-xylene, a lower monocarboxylic acid solvent, and water in the presence of cobalt (148 ppm) and manganese (129 ppm), and bromine (563 ppm) (see table II, col.

13) into an oxidation reactor at 210⁰ C (see col . 2 ,lines 42-56) in the presence of oxygen;

b. removing the product as a slurry from the oxidizer;

c. feeding the slurry of the terephthalic acid mixture to two additional crystallizers where the product is cooled to 105⁰ C;

d. purifying the slurry of the terephthalic acid by filter (see col. 8 ,line 56), centrifuges and dryers (see col .3 ,lines 39-62).

Furthermore, as a result of the process, the TPA "b" is in the range of from 0.9 to 2.0 (see col. 15 , table III).

Scott et al, however, differs from the instant invention in that: the type of the centrifuge and the pressure and the temperature at which the centrifuge is operated , are unspecified; the process is continuous.

Zeitlin et al teaches a process of obtaining terephthalic acid with impurities of 150 ppm p-toluic acid content (see col. 8, lines 5-14) by crystallization using flash evaporation of solvent in 3 to 6 stirred crystallization zones (see col. 4, lines 29-36). Furthermore, the slurry produced in each stirred zone is charged continuously to the centrifuge and in all operations, the centrifuge and the last stirred zone are at the temperature of 149⁰ C and pressure of 67 psig. (see col. 6, lines 51-59). In addition, the reference indicates that small quantities of water added to one or more crystallizers can have a

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significant effect on the reduction of impurities in the crude terephthalic acid (see col. 3 ,lines 36-38).

With respect to the types of the centrifuge, the references are silent. However, this is directly related to the mechanical expediencies. Therefore, it would have been obvious to the skilled artisan in the art to have motivated to optimize the reaction process by upgrading the centrifuge with the specific types. This is because the skilled artisan in the art would expect the reaction process to be facilitated by employing such centrifuges.

Scott et al does teach the process of producing terephthalic acid by oxidation of para xylene in the reactor in the presence of acetic acid solvent containing cobalt and manganese, and bromine and further purifying the resultant slurry of the terephthalic acid by a filtration or centrifuge, and a drying process. Also, Zeitlin et al does teach the process of obtaining terephthalic acid with impurities of 150 ppm p-toluic acid content by crystallization using flash evaporation of solvent ; also, it indicates that small quantities of water added to one or more crystallizers can have a significant effect on the reduction of impurities in the crude terephthalic acid (see col. 3 ,lines 36-38).

Both processes have commonly involved in the purification of terephthalic acid by crystallization. Scott et al expressly describes the use of the centrifuge in the process of isolating terephthalic acid, whereas Zeitlin et al has focused the

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operations of the centrifuges and each stirred zone with the addition of water in the recovery of the terephthalic acid; furthermore, in doing so, there is a significant effect on the reduction of impurities in the crude terephthalic acid (see col. 3 ,lines 36-38).

Therefore, it would have been obvious to the skilled artisan in the art to have motivated to incorporate the teaching of Zeitlin's et al adding water to the crystallizer into the Scott et al process for the purpose of obtaining the purified terephthalic acid acceptable for the manufacture of fibers.

Claims 20-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al (U.S. 4,158,738) in view of Zeitlin et al (U.S. 5,095,146) and D.H. Meyer (U.S. 3,584,039).

Scott et al teaches a process of producing terephthalic acid by oxidation of para xylene in the following steps of :

- a. feeding a mixture of p-xylene, a lower monocarboxylic acid solvent, and water in the presence of cobalt (148 ppm) and manganese (129 ppm),and bromine(563 ppm) (see table II, col. 13) into an oxidation reactor at 210°C (see col . 2 ,lines 42-56) in the presence of oxygen;
- b. removing the product as a slurry from the oxidizer;
- c. feeding the slurry of the terephthalic acid mixture to two additional crystallizers where the product is cooled to 105°C ;

d. purifying the slurry of the terephthalic acid by filter (see col. 8 ,line 56), centrifuges and dryers (see col .3 ,lines 39-62).

Furthermore, as a result of the process, the TPA "b" is in the range of from 0.9 to 2.0 (see col. 15 , table III). In addition, it is possible to undergo the post oxidation treatment after the primary oxidation process in order to reduce further the undesirable impurities in both the terephthalic acid and the mother liquor (see col. 8 ,lines 7-10).

Scott et al, however, differs from the instant invention in that the pressure and the temperature, at which the centrifuge are operated , are unspecified ; decolorizing is accomplished by reacting the crude carboxylic acid solution with hydrogen in the presence of a hydrogenation catalyst; the concentration of cobalt and manganese is 1050 to 2700 ppm and the concentration of bromine is 1000 ppm to 2500 ppm; and the second oxidizing process takes place a higher temperature than the primary oxidation.

Zeitlin et al teaches a process of obtaining terephthalic acid with impurities of 150 ppm p-toluic acid content (see col. 8, lines 5-14) by crystallization using flash evaporation of solvent in 3 to 6 stirred crystallization zones (see col. 4, lines 29-36). Furthermore, the slurry produced in each stirred zone is charged continuously to the centrifuge and in all operations, the centrifuge and the last stirred zone are at the temperature of 149⁰ C and pressure of 67 psig. (see col. 6, lines 51-59). In addition, the reference indicates

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that small quantities of water added to one or more crystallizers can have a significant effect on the reduction of impurities in the crude terephthalic acid (see col. 3 ,lines 36-38).

Furthermore, D.H. Meyer teaches that the impure terephthalic acid is subjected to hydrogenation in the presence of hydrogen and a Group VIII metal on an inert support ; after separation of the reaction solution from the catalyst, the crystallization is conducted to precipitate the terephthalic acid (see col. 2, lines 20-30). Any method of purifying crude terephthalic acid must reduce or eliminate impurities so as to produce the pure terephthalic acid product suitable for the production of super polyesters (see col. 2 ,lines 1-4).

With respect to the claimed concentration of claimed cobalt , manganese and bromine , the prior art does teach that the feed catalyst comprises cobalt (148 ppm) and manganese (129 ppm), and bromine(563 ppm) (see table II, col. 13). The claimed concentration and prior art do not overlap, but are close enough that one skilled artisan in the art would have expected them to have the same properties in the absence of an unexpected result. Furthermore, the limitation of a process with respect to ranges of pH, time and concentration does not impart patentability to a process when such values are those which would be determined by one of ordinary skill in the art in achieving optimum operation of the process. Concentration is well understood by those of ordinary skill in the art to be a result-effective variable , especially when attempting to control selectivity

in a chemical process. Therefore, it would have been obvious to the skilled artisan in the art to be motivated to change from the concentration of the prior art's catalyst to the that of the claimed catalyst by routine experimentation in order to control the selectivity of the process.

Regarding the second oxidizing process conducting at a higher temperature than the primary oxidation, the Scott et al does indicate that operations at higher temperatures also improve energy (heat) recovery with the associated economic benefits (see col. 4 ,lines 42-44). Also, it is possible to undergo the post oxidation treatment after the primary oxidation process in order to reduce further the undesirable impurities in both the terephthalic acid and the mother liquor (see col. 8 ,lines 7-10). Therefore, it would have been obvious to the skilled artisan in the art to be motivated to conduct the second oxidizing process at a higher temperature than the primary oxidation because the operation at higher temperatures does improve energy (heat) recovery with the associated economic benefits (see col. 4 ,lines 42-44).

Scott et al does teach the process of producing terephthalic acid by oxidation of para xylene in the reactor in the presence of acetic acid solvent containing cobalt and manganese, and bromine and further purifying the resultant slurry of the terephthalic acid by a filtration or centrifuge, and a drying process. Also, Zeitlin et al does suggest the process of obtaining terephthalic acid with impurities of 150 ppm p-toluic acid content by operating the centrifuge at the temperature of 149⁰ C. In order to produce the pure terephthalic acid

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product suitable for the production of super polyesters (see col. 2 ,lines 1-4), the D.H. Meyer recommends that the impure terephthalic acid should be subjected to hydrogenation in the presence of hydrogen and the Group VIII metal on an inert support .

All processes have commonly involved in the purification of terephthalic acid by crystallization. Scott et al expressly describes the use of the centrifuge in the process of isolating terephthalic acid, whereas Zeitlin et al has specified the operations of the centrifuges ;furthermore, the D.H. Meyer does suggest that the impure terephthalic acid should be subjected to the hydrogenation process in order to produce the pure terephthalic acid product suitable for the production of super polyesters (see col. 2 ,lines 1-4). Therefore, it would have been obvious to the skilled artisan in the art to be motivated to incorporate the temperature parameter of Zeitlin's et al centrifuge along with D.H. Meyer's subsequent hydrogenation process into the Scott et al process for the purpose of obtaining the purified terephthalic acid acceptable for the manufacture of super polyesters (see col. 2 ,lines 1-4). This is because the skilled artisan in the art would expect such modifications to be successful and effective for the manufacture of super polyesters (see col. 2 ,lines 1-4) as shown in the D.H. Meyer.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cecilia Tsang can be reached on 571-272-0562. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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11/22/04


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